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Glenn Brown
Executive Director-
Public Policy

October 27, 1997

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, NW
Room 222
Washington, DC 20554

RE: CC Dockets 96-45 and 97-160

Dear Mr. Caton:

On May 8, 1997 the sponsors of the Benchmark Cost Proxy Model made a presentation to the Universal Service Joint Board on transmission aspects of the proposed proxy models. During that presentation we agreed to provide source documentation for our statement that the appropriate loss for the loop was 8 dB (not including central office loss of 0.5 dB), and our recommendation that the target range for loop transmission should be 300 Hz to 3200 Hz. Attached is a letter from the Telecommunications Industry Association (TIA) dated January 14, 1992. On page 4, Table 1 titled "Performance Objectives for Generic Access Lines" provides a summary of general loop design parameters. The first line of the chart shows the 8.5 dB loss parameter (loop and central office) at 1004 Hz. The next three lines on the chart show that standards are provided in a frequency range from 304 Hz to 3204 Hz. This indicates the frequency range over which the generic loop is designed to perform.

In accordance with Section 1.1206(a)(2) of the Commission's rules the original and one copy of this letter are being filed with your office.

Acknowledgment and date of receipt of this data are requested. A duplicate of this letter is included for this purpose. Please contact me should you have any questions concerning this matter.

Sincerely,

cc: Mr. Charles Keller

Committee Correspondence

TELECOMMUNICATIONS INDUSTRY ASSOCIATION

TR30.3/92-1020

T1Q1.1/92-019

To: Mike Kalb
Chairman, T1Q1.1 SWG on Voiceband Data

From: Jack L. Douglass
Chairman, EIA/TIA TR30.3

Date: January 14, 1992

Subject: Performance Objectives for Voiceband Data Special Access and Access Lines (Loops)

INTRODUCTION

At the October meeting of TR30.3, we received as liaison information two contributions on the subject of performance objectives for Data access (T1Q1.1/91-060 and -061). We recognize that these contributions do not represent a consensus of your Sub-Working group, but we would like to respond to the issues raised in these contributions.

SPECIAL SERVICES ACCESS

In order to obtain various special services on an end-to-end basis, a customer has to obtain segments of a circuit from an Interexchange Carrier and Exchange Carrier(s). Often an Interexchange Carrier will have responsibility for engineering the circuit and guaranteeing end-to-end performance. In order to determine the end-to-end performance, the performance of the segments must be specified and concatenation rules applied.

T1Q1 should develop a uniform national standard for various types of special access. This standard would specify performance parameters for the access segment, NI to POT. This would serve the same function as TR-TSY-000335. ← 335

The main application of such a standard for voiceband data would be in the provision of dedicated point-to-point and multi-point circuits ("private lines").

The issues of access to the switched PSTN are more complicated.

VOICEBAND MODEMS ON THE PSTN

Modems intended for general use on the PSTN always have been designed with consideration given to the transmission performance of the network. Information, such as the End Office Connection study and the various Loop Surveys, has been used to develop modem technologies that provide good performance over a vast majority of network connections, without special conditioning.

It should be noted that TR30.3 has completed a Technical Bulletin, EIA/TIA TSB 37, which contains a suite of test channels for modem evaluation. This represents our view of the expected performance of the network based on the information available to us. To quote from TSB 37's Scope:

> "The channel characteristics and impairment combinations herein provide a set of particularly stressful conditions more representative of marginal connections than of average connections. The characteristics do not represent worst case conditions that might be encountered."

This document was presented to T1Q1.1 several times during its development, and no comments were received.

It certainly is true that the increasing deployment of digital switching and digital transmission has improved performance for some parameters. It has also introduced new impairments such as slips and impulse noise due to bit errors in digital channels.

Increases in modem data rates have resulted from advances in modem technology, not solely from improved network performance. Echo cancellation, advanced signal processing, and coding have allowed full-duplex data rates to reach 9600 bps (V.32), 14400 bis (V.32bis), and higher.

The newer generation of modem technology has different sensitivity to various impairments when compared to older technologies. We can make the following broad generalizations:

1. Amplitude distortion and Envelope Delay distortion are less critical.

2. Quantization noise, impulse noise, and intermod distortion are more critical.

3. Many modems can "fall forward" and "fall back" (change data rate) in response to line conditions.

4. Some proprietary modems can probe the channel and adapt the modulation and data rate to get optimum performance from the measured channel. A similar capability is planned for the future V.fast standard.

5. Digital frame slips have the same effect as a very large phase hit, and cannot be corrected or compensated.

In conclusion, we believe that the vast majority of properly-designed generic "POTS" loops will provide acceptable performance with modern voiceband modems. Further, we think that the performance objectives for the generic loop should include some data parameters. The objectives for these parameters should be chosen so that they will be met by standard loop design methods. These data parameters normally would not be tested unless a customer reports a problem with voiceband data. These performance objectives should be applicable to both metallic loops and loops derived from DLC systems. It is TR30.3's understanding that T1Q1 is responsible for producing a standard which would replace ANSI/IEEE Std 820-1984.

Table 1 shows our proposed performance objectives for the generic loop.

We further recognize that there may be cases where a special access line (loop) for voiceband data would be required. However, before specifying the parameters of such special loops, we feel that the generic loop must be defined first.

TABLE 1

PERFORMANCE OBJECTIVES
FOR GENERIC ACCESS LINES

Parameter	Objective
1004-Hz Insertion Loss	8.5 dB maximum
Amplitude Distortion (Loss relative to 1004-Hz loss)	
304 Hz	+3.5, -3.5 dB
2804 Hz	+5.5, -1.3 dB
3204 Hz	+7.0, -1.3 dB
Envelope Delay Distortion	
1000 to 2800 Hz (Relative to 1700 Hz delay)	400 us
Message Circuit Noise (idle channel)	26 dBrnC
C-notched Noise (-13 dBm holding tone)	40 dBrnC
Intermodulation Distortion	
R2	48 dB minimum
R3	50 dB minimum
Phase Hits (>40 degrees)	none
ADPCM	none
Impulse noise (>59 dBrnC)	<15 counts in 15 minutes